DOCUMENT RESUME

ED 266 023 SE 046 406

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TITLE Evaluation of Experimental Concentration of Studies in Upper Secondary School.

INSTITUTION National Swedish Board of Education, Stockholm.
REPORT NO 1985:7
PUB DATE Aug 85
NOTE 14p.
PUB TYPE Reports - Evaluative/Feasibility (142)
JOURNAL CIT School Research Newsletter; n7 Aug 1985

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Educational Research; *Mathematics Achievement; Mathematics Education; *Program Evaluation; Secondary Education; *Time Factors (Learning); *Time Management
IDENTIFIERS *Sweden

ABSTRACT

Experimental schemes of concentrated studies have been in progress for some years at a number of upper secondary schools in Sweden. Concentrated studies involve concentrating the number of periods devoted during an upper secondary school course to the teaching of one subject within a shorter period of time than is laid down by the regular time schedule. For example, a subject which is normally alloted 2 hours per week for 6 weeks can be taught 3 hours per week for 4 weeks. Evaluation efforts have considered the implications of the concept of concentrated studies. This working approach is discussed as a time-tabling reform, viewed in terms of educational administration, and also, from the student's point of view, as a learning situation (particularly with reference to mathematics achievement). Consideration is also given to the feasibility of evaluating such an extensive education program as concentrated studies. This final report does not contain any comprehensive evaluation of concentrated studies. On the other hand, it is observed that the experiments investigated cannot provide a basis on which to assess the value of the ideas underlying the concentration principle. The value of the idea of concentrated studies, then, is a question which still remains to be answered. (JN)

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SWEDISH NATIONAL BOARD OF EDUCATION

SCHOOL RESEARCH Newsletter

ED266023

AUGUST 1985 FIELD - TOPIC 1985:7

Concentration studies
Upper secondary school
Evaluation

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Concluded project

TITLE OF PROJECT: EVALUATION OF EXPERIMENTAL CONCENTRATION OF STUDIES IN UPPER SECONDARY SCHOOL

An experimental scheme of concentrated studies began at Norra Latin Upper Secondary School in Stockholm in the 1971/72 school year. The results of this experiment were on the whole encouraging and during the late 1970s the scheme was expanded to include an increasing number of schools. At its peak, in 1981, there were 16 upper secondary schools involved. In the autumn of 1981, at the instance of the NBE, we also embarked on the evaluation which is now being concluded and of which the following report is a summary.

In our evaluation we have considered the implications of the concept concentrated studies. This working approach is discussed as a time-tabling reform, viewed in terms of educational administration, and also, from the student's point of view, as a learning situation. Consideration is also given to the feasibility of evaluating such an extensive educational programme as concentrated studies.

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Responsible Editor: Inger Marklund. Editor: Marianne Carlsson

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Experimental schemes of concentrated studies have been in progress for some years now at a number of upper secondary schools in Sweden. As a preliminary and concise description, concentrated studies can be said to involve concentrating the number of periods devoted, say, during an upper secondary school course to the teaching of one subject within a shorter period of time than is laid down by the regular time schedule. A subject which in the regular time schedule is allotted two hours per week for six terms can instead be allotted three hours per week for four terms or four hours weekly for three terms and so on. Thus there is no change in the total time input for the subjects. It is this change in the allocation of periods which the current experiments have in common. Otherwise they differ in various respects.

Structure of the experiments

When the experimental scheme was at its most extensive in 1981, experiments were in progress at 16 schools. The following year, in 1982, a new normal time schedule came into force and several schools began winding up their experiments. The experiments were also discontinued for other reasons, and experimental activities are now in progress at eight schools.

The organisation of the experiments in the different schools varied a great deal as regards both the numbers of lines, classes and subjects involved and the amount of deviation from the normal time schedule. One of the purposes of concentrated studies has been to reduce "subject fragmentation" in schools and the number of subjects taken simultaneously. Some idea of the variation occurring in this respect can be gained from table 1, which shows how the number of subjects taken simultaneously varies in the lines of study affected by concentrated studies, together with the number of subjects normally taken simultaneously.

Table 1. No. subjects taken simultaneously per term. Variations in the degree of concentration.

	No. subjects per line	Variation in average no. subjects per term during concentrated studies	Average No. subjects per term for normal studies	Variation in no. concentration subjects	Variation in degree of concentration, all subjects	Median value	N
Ek	11	8.0- 8.8	9.5	2- 4	1.18-1.30		2
So	12	6.8-10.0	10.5	1- 9	1.08-1.63	1.50	7
E	15	7.0- 9.7	10.3	2-12	1.10-1.63	1.39	8
H	15	6.3- 9.2	11.3	5-12	1.22-1.83	1.39	7
N	16	6.2- 9.8	11.3	5-15	1.24-2.08	1.56	13
S	14	6.0- 9.0	10.7	5-13	1.25-1.96	1.47	11
T	12	6.7- 8.2	9.0	3- 7	1.14-1.48		3

Ek = Economics (2-year)
So = Social
E = Economics (3-year)
H = Liberal arts
N = Natural science
S = Social Science
T = Technology

As can be seen from the above table, the degree of concentration varies a great deal from one experiment to another. The number of subjects studied on a concentrated basis can be anything between 1 and 15. Consequently there can be anything from marginal changes in subject fragmentation to a reduction by almost half of the number of subjects taken simultaneously in any one term.

The degree of concentration, i.e. the extent to which the timetable is concentrated, also varies. One simple yardstick in this respect (degree of concentration in table 1) is obtained by relating the number of terms compared to a subject according to the normal time schedule with the number of terms devoted to it in a concentrated time schedule. If a subject is normally studied for six terms but is allocated four terms in an experiment, this gives a ratio of 6:4 or 1.5. If the number of terms is halved in an experiment and the subject taken, for example, for three terms instead of for six, this gives a degree of concentration of 2.0. The degree of concentration for concentration-

study subjects, thus computed, varies between 1.2 and 4.0. Calculating the average for all subjects in a class, one obtains the variations indicated in table 1 (the figures in which refer to conditions during the 1981/82 school year).

Thus a concentration time schedule can be designed in many different ways. Another relevant consideration here is the array of subjects during a given term. Turning to consider the students' weekly timetables, one finds that subject fragmentation on individual days can be just as great with concentrated studies as with normal studies. This happens when the frequency of lessons is increased instead of their duration.

Four main arguments have been advanced in favour of concentrated studies in connection with the experimental activities. These are (1) that concentrated studies reduce subject fragmentation, (2) that they give the students more control of their own work, (3) that they facilitate interdisciplinary co-operation, and (4) that they facilitate school routines which activate the students. If these arguments are viewed in relation to the organisation of the various experiments, one is prompted to ask for a definition of concentrated studies.

The concept of concentrated studies and the purpose of the inquiry

The experiments now in progress were pioneered by the former Norra Latin Upper Secondary School in Stockholm (since renamed Tensta Upper Secondary School). This school had already had several years' experience by the time other experiments came to be planned and inaugurated. Accordingly, it provided a source of inspiration and a point of reference for the other experiments. In terms of concentration study experiments and ideas generally, however, the Norra Latin experiment is a recent phenomenon. Its immediate predecessor was an experimental scheme of concentrated studies followed by split matriculation at Djursholm Co-educational High School in the 1920s. Subject fragmentation and the need for concentration of studies, however, have been a moot point far longer than this. Herbart wrote as early as 1835: "Two

hours a week for one subject and two hours for another, every subject with an interval of two or three days, is an old madness which cannot lend any coherence to teaching". Several official inquiries into the school system since the second half of the 19th century have devoted a great deal of attention to subject fragmentation, and various arrangements have been discussed for establishing a more uniform working situation in schools.

Ideas of study concentration have been pleaded for on essentially three lines. One can speak of classical concentration, which regards teaching and studies as centring round formal educational subjects. There is objective concentration, aimed at achieving uniformity and coherence with regard to the content and structure of the subjects. Finally, one can discern a rational concentration, meaning that teaching content is made to centre round a topic of inquiry or a problem and is structured with reference to ideas of the student's mental activity or cognitive structure.

These ideas are also present in the experiments we have evaluated. There have been theories concerning the suitable presentation of school subjects, but there have also been ideas of achieving a study situation more in harmony with the thinking habits of the student.

Between them these things - the differing organisation of the experiments and their objectives - have diverted interest away from the experiments as a time schedule reform, and the evaluation has instead been made to concentrate on investigating the effect on the students' study and learning situation of using a concentrated time schedule. The evaluation, then, is concerned not so much with the significance of the time allocations for various subjects as with the students' study and learning situations. The empirical section of the inquiry consists of four case studies, the aim of which has been:

- By describing the conduct of a concentrated studies experiment in a school, to outline an institutional framework for the modification of study activities.

- To ascertain, by limited measurements of effect, whether it is reasonable to suppose that the experiments result in any appreciable changes in the pupils' cognitive retention, measured in traditional terms.
- To attempt, by describing the teaching and learning process, to identify factors respectively favouring and obstructing the realisation of the pedagogical ideas which can be associated with the principle of concentrated studies.

School and knowledge

The investigation which has been made of the conduct of an experiment yields an institutional aspect of the experimental scheme. Questions are elucidated concerning the initiation of the experiment, changes which materialised, the limited scope of those changes and the successive winding up of the experiment. The teachers' anticipations of events and scepticism and uneasiness at the events which actually occurred occupy a prominent position in the description. There was no developed pedagogical idea behind the experiment, and this made the activities vulnerable to the problems which occurred. These problems were partly administrative, but there also began to be doubts as to the possiblity of maintaining the students' cognitive standard with concentrated studies. This resulted in the experiment being wound up.

Concentrated studies are designed to establish a different study and learning situation for the students. This makes it conceivable that the students then acquire different knowledge or acquire their knowledge differently than is the case in regular studies. But there is also certain knowledge which schools are required to transmit to their pupils, and there are established methods of measuring such knowledge. These requirements cannot be entirely disregarded, even if pupils pursuing concentrated studies were to acquire a different type of knowledge. For this reason, all students in one year of the Natural Science line were given a mathematics test. Taken as a group, the students on concentrated studies showed a significantly better achievement than a representative sample of students from all over the coun-

try. We were also in a position to measure retention one year after the students had completed their mathematical studies, and the results at this point still appeared to be good in relation to the reference group. This finding, however, must be treated with great caution. Our material is small and, moreover, there is a pronounced social bias in the classes taking part in the experiments. The results we obtained lead us to ask, for example, whether the superior test results were a consequence of the social structure of the classes or whether the effects of concentrated studies varied depending on the social structure of the class.

Concentrated studies, students and the subject

The two studies mentioned above elucidate outward aspects of the experiments. The school study deals with the organisational side of things and the mathematics test deals with the extent to which the students achieve the cognitive targets defined by schools and society. The other two case studies are concerned with internal aspects. In them, efforts are made to identify opportunities and problems relating to concentrated studies and inherent in the teaching and learning situations. These are in fact the two aspects considered in the two studies.

In administrative, time-scheduled terms, concentrated studies mean that a school subject is allotted more hours per week during the period it is taken than in the normal time schedule; this gives us a concentration of hours per week for what the curriculum refers to as a subject. In terms of the student's study situation, this can be variously manifested.

As stated earlier, the concentration of hours per week involved by the experiments is seldom matched by a similar concentration of hours per day. Consequently, subject fragmentation in the course of one day can be just as great in concentrated studies as in normal studies. But concentrated studies also mean concentration of the subject. The subject is supposed to be intelligible to the student as a coherent

whole, since he is able to devote his more undivided attention to the study of each individual subject. The subject boundaries envisaged are those of the curriculum. But disciplinary coherence is not immediately apparent to the students and if the subject is then divided into sections, each of which is taken separately, and homework set on one section at a time, the subject matter can be regarded as a collection of assignments instead of one subject. Furthermore, in concentrated studies just as in normal studies, assignments vary in character. There are group assignments to be completed, homework to be done, lectures to be prepared and examinations to be revised for. From the student's viewpoint, then, the subject-based whole is not necessarily apparent; instead there may be different assignments competing for scope without being united in any obvious way by disciplinary relationships. School work as viewed by the student may be a collection of assignments to be completed, and if assignments in the individual subjects do not grow fewer in number, in such a way as to become more extensive, more coherent and unitary, the congestion of assignments associated with normal studies will remain. The difference is that with concentrated studies the assignments refer to a smaller number of different subjects per week, but the students have just as many different assignments to cope with as in normal studies. Judging by the views expressed by the students, concentrated studies appear if anything to compound the congestion of assignments.

Reference to assignments instead of subjects means applying a different basis of classification from that used, for example, in the curriculum; this is the students' way of classifying what is presented in school. But the students also make these assignments personal undertakings. If the assignment is a given passage set for homework, the student undertakes to learn parts of this passage or an interpretation of it, and he tries to master it in a particular way, e.g. in the sense of being able to recount individual facts from the passage or of being able to describe the structure of an argument in it. The student makes the assignment, or interprets it as, a learning project. Learning projects, then, are the intellectual enterprise which a student undertakes when attempting to complete an assignment. The projects in which the

students involve themselves are for the most part procedure-related, in the sense of being governed by questions as to what one has to know, how one is to write, what is to be written and so on. These questions are concerned with the practical conduct of the assignment, not with its subject or content. This procedural approach on the students' part may to some extent be due to difficulty in perceiving personal relevance and discovering structures in a subject content which would facilitate subject-related learning projects and the construction of coherent conceptions.

If meaningful learning means relating new knowledge to what one already knows, knowledge of the conceptions which students already have when entering into a learning situation is essential in order to understand what they can learn and why they learn what they do learn. In the scientific field there is extensive research concerning the nature of such conceptions and their effect on students' learning. These student conceptions have been termed students' alternative frameworks. One result of this research has been to establish that these alternative frames of reference are very stable and that students are reluctant to abandon them in favour of the frames of reference offered by teaching. They retain their old conceptions and they learn what school offers them so that they can cope, for example, with a written test; this, then, is a procedural approach detrimental to the construction of new contexts of meaning.

Judging by our inquiry, it seems as though we must also be prepared for the occurrence of alternative frames of reference in the liberal arts. Our interpretation also indicates that we must be prepared for frames of reference of this kind at different levels. One level is concerned with other ways of understanding the concepts posed by teaching in the form of elements in the explanations given - i.e. a form of verbal comprehension but also comprehension of the concepts explained. Another level is concerned with conceptions of the subject as such - conceptions as to what a subject is about, what counts as an explanation in that subject and what can be explained in it. If the students' conceptions at this level do not coincide with those taken for granted

in teaching, it will be difficult for the students to weight the information given and to grasp the point of descriptions and explanations. In a word, it will be hard for the students to see what the subject is all about, in which case one natural response will be to withdraw into procedural projects of the kind already mentioned. It is impossible for the students to see any order or coherence in the picture of a subject content presented at school, because they do not have the rules required to interpret it.

The final report on the project does not contain any comprehensive evaluation of concentrated studies. On the other hand, it is observed that the experiments investigated cannot provide a basis on which to assess the value of the ideas underlying the concentration principle. The value of the idea of concentrated studies, then, is a question which still remains to be answered. This observation prompts a number of viewpoints concerning evaluation as an activity, and these form the conclusion of the report. Attention is drawn to the necessity of defining concepts in connection with evaluations, not only so as to elucidate the express aims of a reform programme but also as part of the process of creating insight into the relation of the reform programme to the ideas pursued. In this way evaluation can not only supply a basis on which to assess goal achievement and the implementation of a programme but can also supply knowledge of more general educational relevance.

Reports and other publications from the project

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Halldén O., Learning history. Unpublished paper, Department of Education, Stockholm University, to be published in autumn 1985.

SCHOOL RESEARCH NEWSLETTER

School Research Newsletter contains reviews of current and terminated research within the field of education.

School Research Newsletter is published and distributed in an edition of 450 issues ten times per year. The Newsletter is obtained free of charge.

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